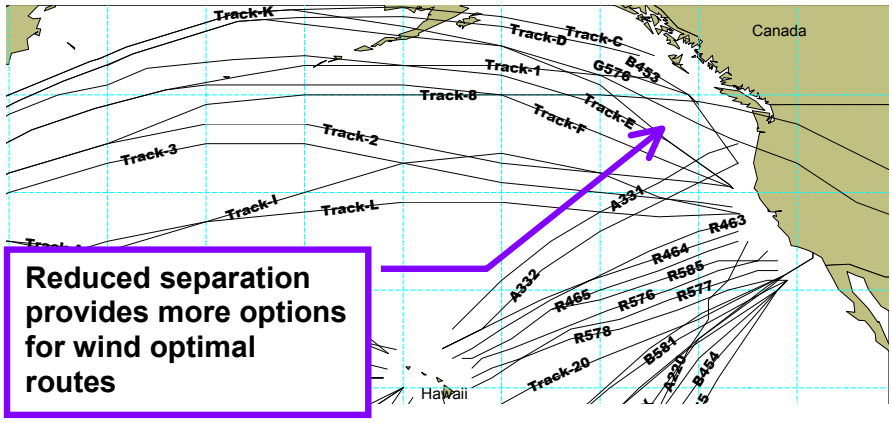
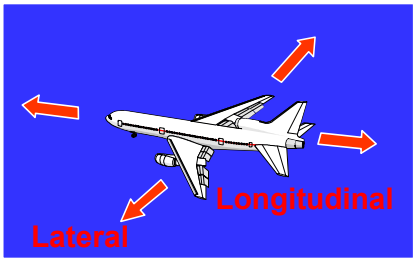
ER-6: Reduce Oceanic Separation

30 nm lateral and longitudinal (30/30) separation in the ocean.





Background

- *Separation Standards Factors.* Separation standards in a given airspace are a function of the communication, navigation, and surveillance capabilities available in a specific operating environment. Safety analysis and operational judgement consider factors such as: timeliness and reliability of controller-pilot communications, accuracy of aircraft navigation, the controller's ability to determine potential separation loss, aircraft traffic density, and procedures for contingencies such as engine failure and weather deviations.
- *RNP Concept*. The Required Navigation Performance (RNP) concept has been introduced in Pacific operations to standardize navigation. For example, RNP-10 approved aircraft are equipped with navigation systems that can navigate within 10 miles of desired position with 95% probability.
- *Current Separation Standards.* Currently, the minimum lateral separation applied by the FAA is: 120 nm in Atlantic and Caribbean/South American airspace, 60 nm in North Atlantic minimum navigation performance specification airspace, 50 nm between RNP-10 approved aircraft in Pacific airspace except in the Central Pacific where, due to convective weather, 100 nm lateral is applied south of 30N.

  Conventional longitudinal separation is 10 minutes (approximately 80 nm). 50 nm longitudinal separation is currently applied by South Pacific air traffic service providers having enhanced CNS/ATM systems, to aircraft approved for Controller Pilot Data Link Communications (CPDLC) and RNP-10 (10 nm/95% probability).

- *Current Deployment of ADS-A Systems.* Air Traffic Service Providers in New Zealand, Australia, and Tahiti use Automatic Dependent Surveillance-Address (ADS-A) systems in Pacific oceanic airspace. In addition, Fiji plans to deploy an ADS-A system in 2001 and a similar system is under operational testing in Tokyo oceanic airspace.
- *Status of Aircraft System Approvals*. The FAA and other civil aviation authorities have certified ADS-A, CPDLC and RNP capabilities on aircraft such as the B-747-400, B-777 and the A-340.

Ops Change Description

30/30 Separation. The ICAO Separation and Airspace Safety Panel has established standards for the implementation of 30 nm lateral and longitudinal separation that call for: direct controller-pilot communication via voice or datalink, aircraft navigation accuracy to RNP-4 (4 nm/95% probability) and ADS-A capability in the aircraft and at the oceanic center.

FAA ADS-A/ATOP Program. The Advanced Technology and Oceanic Procedures (ATOP) program will deploy ADS-A capability in airspace where the FAA provides oceanic air traffic services. FAA oceanic centers currently offer Controller-Pilot Datalink Communication (CPDLC) service to equipped aircraft.

The ATOP system will enable the application (to properly equipped aircraft) of 50 nm longitudinal separation (extended use) and 30 nm lateral and longitudinal separation. These reduced separation standards will increase oceanic airspace capacity and aircraft time/fuel burn efficiency. ATOP will also improve the safety of oceanic operations by giving controllers enhanced tools to track aircraft progress and identify potential aircraft conflicts and problems.

Benefits, Performance and Metrics

- *Fuel/Time Savings.* Provides equipped users with fuel and time savings, more reliable and optimum routes and greater likelihood of timely granting of requests for clearance changes.
- *Flown as Filed.* Percentage of flights cleared as filed will increase. As a result, fewer altitude change or speed commands are needed because of the pilot's ability to maintain spacing and the smaller separation "bubble" required around each aircraft.
- *Route Efficiency.* The number of routes moved closer to great circle or minimal wind route are expected to increase, resulting in the reduction of fuel load as route reliability increases.
- *Block Time Index.* Lateral reductions have been shown to reduce fuel consumption, which has routinely been taken by carriers in the form of block time savings.
- *Step Climbs.* Increase in user requests granted for procedures such as step climbs.
- *Safety Benefit/Collision Risk Reduction.* Enhanced ATOP surveillance capabilities combined with CPDLC communication enhancement will enable controllers to detect and intervene when aircraft deviate from cleared track or altitude and mitigate the risk of conflict with other aircraft.

Scope and Applicability

- *Enhanced Surveillance in FAA Controlled Oceanic Airspace.* ADS-A will provide enhanced surveillance capability in Oakland, Anchorage, and New York oceanic airspace. ADS-A will enable the FAA to apply 30 nm lateral and longitudinal separation in that airspace.
- *Initial Goals/Dates.* Initial FAA goals are to implement 30 nm lateral and longitudinal (30/30) separation in Oakland controlled South Pacific airspace by 2005. This will be expanded to additional FAA controlled airspace as ADS-A deployment plan progresses and as more aircraft become RNP-4 capable and approved. The introduction of 30/30 into the South Pacific airspace, where Reduced Vertical Separation Minimum (RVSM) has been in use since 2000, will result in that airspace being *the most efficient oceanic airspace in the world.*
- *Aircraft Fleet Equipage.* 30/30 separation and enhanced surveillance will only apply to appropriately equipped aircraft. Aircraft system requirements for 30/30 include CPDLC, RNP-4 approval, and ADS-A.
- *Contingency Procedures.* Contingency procedures will be developed for loss of communications, ADS-A or aircraft RNP-4 capability, aircraft system malfunctions, and weather deviations.

Key Decisions

- *Operator Commitment to Oceanic Datalink.* User community must commit to unified data link evolution.
- *Cost/Safety Benefits.* To increase levels of aircraft equipage, operators must be convinced of cost/benefit and safety enhancements gained by ATOP deployment.
- *Aircraft Fleet Equipage.* To maximize ADS-A benefits, aircraft fleet equipage with CPDLC, RNP-4 and ADS-A capabilities must increase significantly. (Currently approximately 20% of oceanic flights are so equipped.)
- *Plan for Accommodation of Mixed Equipage.* Plan to accommodate aircraft with mixed CNS capabilities for an extended period of time must be developed and accepted.

Key Risks

- *ADS-A System Deployment.* ADS-A system must progress without significant delay to IOC and Build II at Oakland ARTCC.
- *ADS-A System Performance.* ADS-A system must perform at prescribed levels of reliability and availability.
- *Staff Resources.* Adequate experience and staffing levels to support national and local procedures development, operator approval, and transition of systems for the separation standards in ocean and remote areas.

- *AFS Resources.* Availability of Flight Standards specialist resource to assess ADS-A system performance and capability to mitigate collision risk and enable aircraft separation reduction.
- *ICAO Requirements.* Final ICAO Requirements for 30/30 application must be available by January 2002 for inclusion in ATOP Build II system requirements.
- *30/30 Implementation Requirements.* Acceptance of adequacy of 30/30 implementation requirements such as safety analysis, ground and aircraft capabilities, and contingency procedures.
- *Operator Commitment to Aircraft Equipage.* Cost/ benefit and safety analysis to advocate fleet advanced CNS equipage beyond current approximate 20% level.
- *Revision of ICAO Regional Policy Documents.* Publication of 30 nm lateral and longitudinal standards in ICAO Asia and Pacific Regional Supplementary Procedures.
- *Aircraft Equipage Mandate*. Long term plan to mandate aircraft equipage with advanced CNS capabilities must be developed.